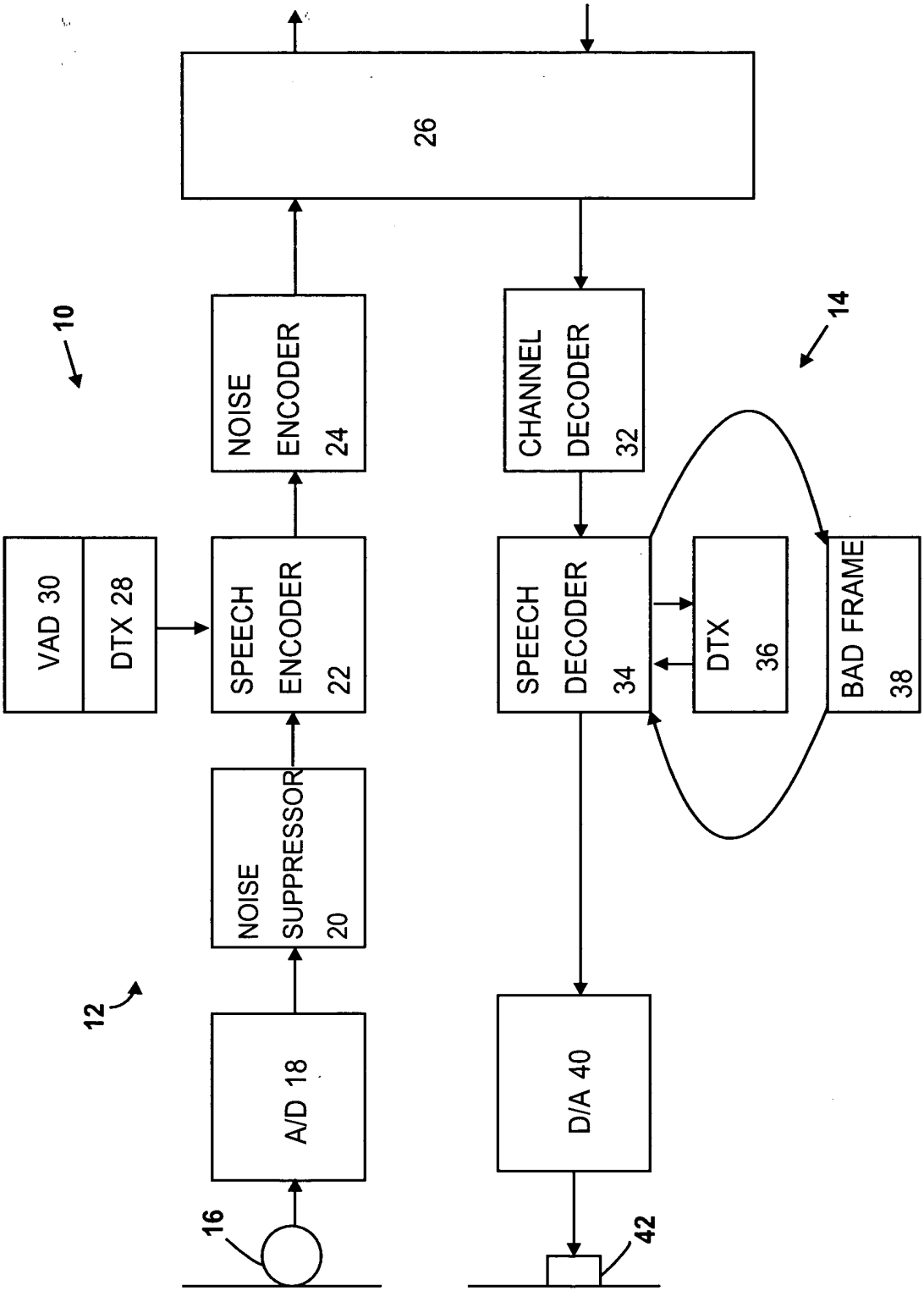
26
10
NOISE ENCODER 24
CHANNEL DECODER 32
14
VAD 30
DTX 28
SPEECH ENCODER 22
SPEECH DECODER 34
DTX 36
BAD FRAME 38
NOISE SUPPRESSOR 20
12
A/D 18
D/A 40
16
42

Fig. 1

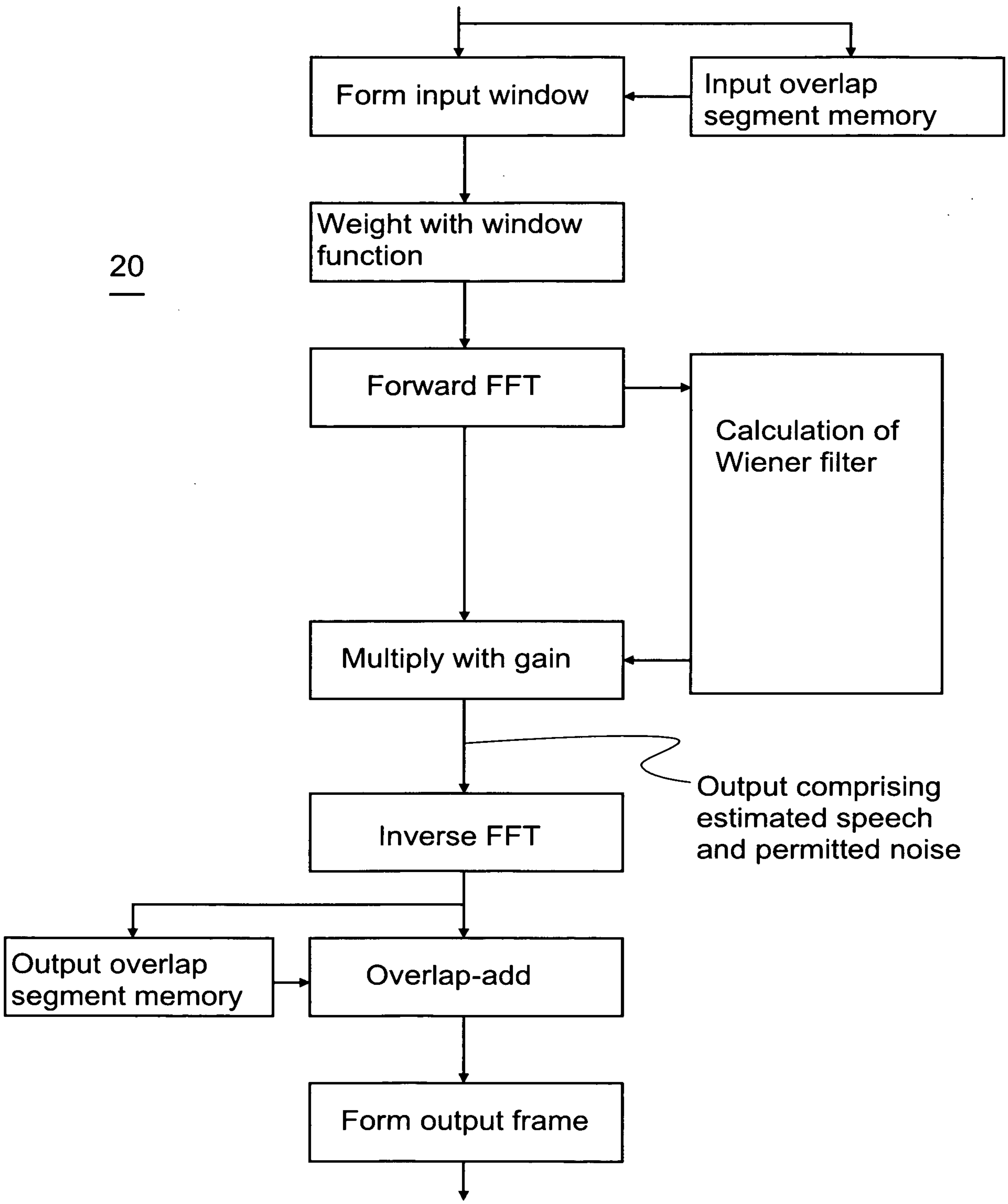

Fig. 2

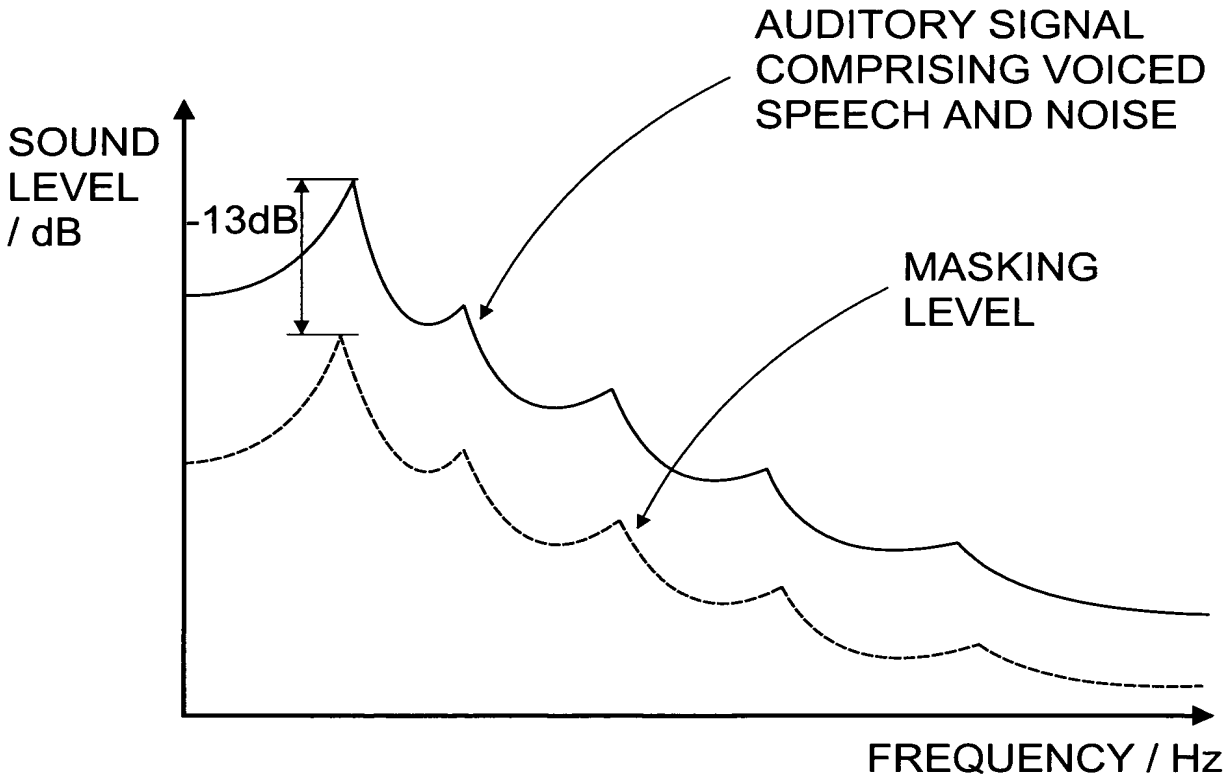
AUDITORY SIGNAL
COMPRISING VOICED
SPEECH AND NOISE
SOUND
LEVEL
/ dB
-13dB
MASKING
LEVEL
FREQUENCY / Hz

Fig. 3

Transform the time domain noisy speech signal input to frequency domain	
STEP 1	- Estimate a first speech periodogram - set the mask at - 13dB of the speech power - estimate the noise periodogram - compute the speech+masked noise periodogram - update the number of block for time averaging - calculate the forgetting factor for noise psd updating
STEP 2	calculate the input power (speech periodogram + noise psd)
STEP 3	Compute the Wiener filter
STEP 4	update the noise psd
STEP 5	- Estimate the signal-to-noise ratio - compute the Higher order Wiener filter - estimate the current speech periodogram
STEP 6	- determine the amplification level at each band - amplify the Wiener filter
STEP 7	Choose a value for the noise reduction level at the output
STEP 8	compute the final Wiener filter and multiply it with the input to produce the output estimate
Transform the frequency domain estimated output to time domain	

Fig. 4

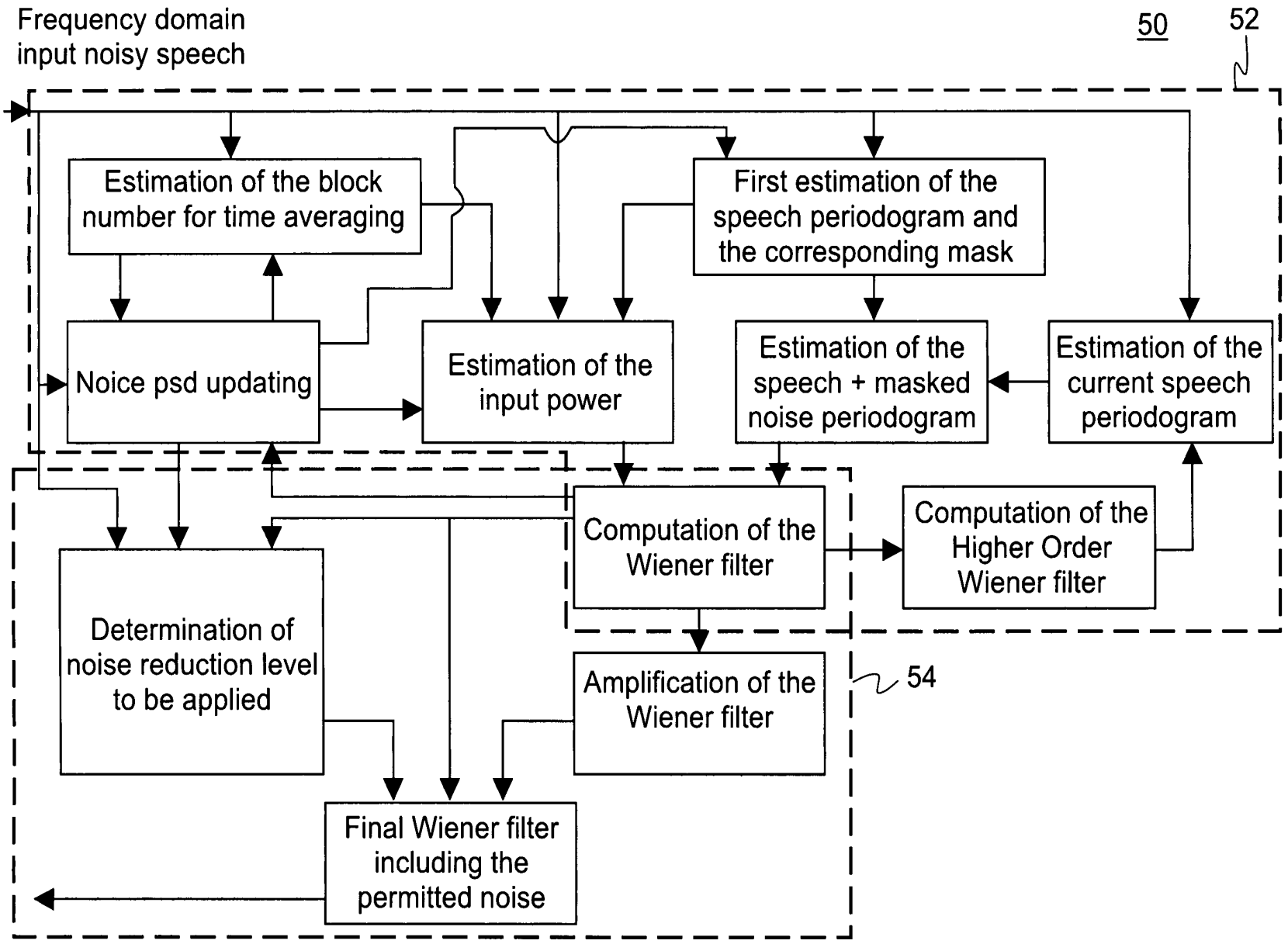
Frequency domain
input noisy speech
50
52
Estimation of the block number for time averaging
First estimation of the speech periodogram and the corresponding mask
Noice psd updating
Estimation of the input power
Estimation of the speech + masked noise periodogram
Estimation of the current speech periodogram
Computation of the Wiener filter
Computation of the Higher Order Wiener filter
Determination of noise reduction level to be applied
Amplification of the Wiener filter
54
Final Wiener filter including the permitted noise

Fig. 5